

RESEARCH

Open Access



# Therapeutic approaches and conceptions of practice of osteopaths in Australia - a national cross-sectional study and exploratory factor analysis of the Osteo-TAQ

Oliver P. Thomson<sup>1,2\*</sup>, Gopi Anne McLeod<sup>2,4</sup>, Michael Fleischmann<sup>2,5</sup> and Brett Vaughan<sup>2,3</sup>

## Abstract

**Background** Health professionals develop their own approach to patient care based on education, experience and philosophical stance. Literature suggests that this practice approach informs patient care, and clinical outcomes. The Osteopaths' Therapeutic Approaches Questionnaire (Osteo-TAQ) is a novel 36-item instrument developed from qualitative grounded theory research with osteopaths in the United Kingdom. The aim of the study was to develop evidence for the structural and construct validity of the Osteo-TAQ in the Australian osteopathic profession and provide initial descriptive data about the therapeutic approaches of osteopaths in Australia.

**Methods** A cross-sectional study design was used to collect data from registered osteopaths in Australia using the Osteo-TAQ and analysed with Exploratory Factor Analysis (EFA). The EFA utilised parallel analysis to determine the number of factors to extract and McDonald's omega calculated as the reliability estimation statistic.

**Results** 691 Australian osteopaths provided data for the study, representing 25% of the Australian osteopathic profession. Empirically the number of factors to extract based on the parallel analysis was seven. Two- and three-factor solutions were evaluated given the underpinning theory identifying two conceptions of practice and three interrelated therapeutic approaches. Both the two- and three-factor solutions were consistent with the underpinning theory with acceptable reliability estimations for each factor. Descriptive data suggested the most common element of the therapeutic approach of Australian osteopaths was establishing rapport, while the least common was 'only talking' with their patients.

**Conclusions** This study provides evidence for the structural, content and construct validity of the Osteo-TAQ in an Australian osteopathic practitioner population. The results support both a two- and three-factor structure for the Osteo-TAQ in an Australian osteopathic population, with each factor demonstrating acceptable reliability estimations supporting the items comprising each factor as measuring a single construct. From a theoretical and

\*Correspondence:

Oliver P. Thomson  
oliver.thomson@uco.ac.uk

Full list of author information is available at the end of the article



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

empirical perspective, it can be inferred that the Osteo-TAQ tool encapsulates an osteopaths' conception of practice (professional artistry and technical rational) and three main therapeutic approaches to patient care: Educator, Communicator and Treater. Further research is required to explore each of these therapeutic approaches to better understand how they relate to an individual osteopath's conception of practice, and their associations with other measures of practice including clinical outcomes.

**Keywords** Osteopath, Osteopathy, Osteopathic Medicine, Workforce, Clinical decision-making, Grounded theory, Therapeutic approach

## Background

Osteopathy is a healthcare profession that focuses primarily on musculoskeletal health. This is mostly achieved through manual (hands-on) treatment, and may also include psychological support, self-management techniques, and exercise interventions [1, 2]. Osteopaths and osteopathic theory have traditionally claimed to base clinical reasoning, decision-making, and patient care on 'whole person' principles [3]. However, there seems to be some variation in how practitioners incorporate these principles into their practice [4] suggesting possible diversity in the nature of patient care provided by osteopaths. To date, there has been some research into the clinical work of osteopaths including exploration of patient (e.g. health conditions treated) and practice (e.g. examination and treatment interventions provided) variables [2]; however, it is currently unknown how osteopaths' approaches to clinical practice impact patient outcomes. To enhance the quality of patient care, it is imperative that the profession of osteopathy engages in critical reflection and question long-established assumptions, contributing to a deeper comprehension of the nature of clinical practice and the intricate interactions between osteopaths and patients [5]. This study included the validation process for a novel tool, the Osteo-TAQ, which aims to describe and measure the multi-dimensional aspects of osteopaths' conceptions and approaches to the care and treatment of patients in Australia.

## Osteopathy in Australia

In Australia, osteopathy is a government-registered allied health profession regulated by a statutory professional board, the Osteopathy Board of Australia [6]. As of December 2023, there were 3426 registered osteopaths in Australia, a 6.6% increase over the previous year, with just over half identifying as female (54.3%) [6]. The majority of Australian osteopaths work in private clinical practice where they see patients experiencing primarily musculoskeletal conditions [7]. Precise details of their clinical practice are not well understood, prompting the need for an up-to-date exploration of osteopathic clinical practice in Australia. An osteopathic workforce survey conducted in 2018 by Adams et al. [7] has provided information on the practice characteristics of Australian osteopaths. This includes the types of conditions they

treat, their practice locations, clinical experience and level of osteopathic training. Workforce surveys of this kind and similar conducted in other countries [2] including France [8], Portugal [9] and the UK [10] provide valuable insights into numerous features of osteopathy and osteopaths that help the profession gain an enhanced understanding of service delivery and where to position and prepare itself in relation to the healthcare system. For example, Australian workforce surveys show that osteopaths use a range of manual therapy techniques for the management of musculoskeletal disorders [7, 11, 12]. National workforce surveys also have an important role in providing regulatory authorities and lobby groups with information to support regulatory processes in countries where osteopathy is still undergoing professionalisation, for example, Spain [13] and Belgium [14].

## Existing measures of osteopathic practice

There are currently no published questionnaires that have been validated with the specific purpose to capture the different aspects of how osteopaths' conceptualise clinical practice and approach patient care and treatment. There are various measures that assess focused areas of a clinician's practice with many of them examining practitioners' attitudes and beliefs towards musculoskeletal conditions encountered in practice, such as low back pain. For example, the Pain Attitudes and Beliefs Scale for Physical Therapists (PABS-PT) has been developed to reveal a clinician's preference for either a biopsychosocial or biomedical model of care [15]. Another tool which has been used to gauge the attitudes and beliefs of physiotherapists towards treating back pain is the Attitudes to Back Pain Scale in Musculoskeletal Practitioners (ABS-mp) [16]), developed from interviews with physiotherapists, chiropractors and osteopaths. Similarly, the ABS-mp assesses a musculoskeletal practitioner's biomedical or biopsychosocial orientation and related attitudes. Measures have also been developed to assess healthcare practitioners' fear-avoidance beliefs [17] and beliefs about back pain [18]. The literature contains several examples of studies that utilise the previously mentioned measures to explore osteopaths' beliefs and attitudes towards back pain and lifting [19] and back pain in general [20–23]. Other measures have been used to evaluate osteopaths' beliefs about pain [24, 25]

and empathy within a patient-centred care context [26] using the Consultation and Relational Empathy (CARE) instrument [27]. While there are various tools available to measure different aspects of clinical practise, their use in generating knowledge and evidence of osteopathy as a complex, person-centred and relational intervention has limitations. Many of the measures currently available may not reflect the current scope and context of osteopathic practice in Australia [7]. These tools have typically been developed within the physiotherapy and medical fields, and it remains unclear how well they align to the practice, clinical reasoning and behaviour of osteopaths. Furthermore, these measurement tools tend to focus on specific clinical presentations such as back pain and fail to capture the broader multidimensional thinking of practitioners. It is widely recognised that osteopathy, like all healthcare practice, is complex and multidimensional, meaning that practitioners draw upon a range of knowledge sources when treating a particular patient, within a particular time and therapeutic relationship [28]. Given these limitations, there is a need to develop a measurement tool that can evaluate the multiple interacting domains of osteopathic care across diverse practitioner populations, regardless of their therapeutic approach.

#### **Underpinning theory - conception of practice and therapeutic approach**

Through extensive grounded theory research by Thomson et al. [29–32], the core category of *conception of practice* was introduced as a multi-dimensional construct encompassing an osteopath's therapeutic approach, professional identity, clinical decision-making, perceived therapeutic role, their focus during patient interaction, and personal view of health and disease [29, 30]. According to Thomson's original theory, osteopaths adopt one of three different *therapeutic approaches* in their clinical practice, namely *Treater*, *Educator* and *Communicator*. The different characteristics and elements of each have been described in detail elsewhere [29, 31, 32]. Briefly, the Educator approach involves working with patients to develop knowledge about their health conditions and the various options available to them. The Communicator approach focuses on building a strong patient-practitioner relationship to co-construct a shared understanding of their treatment plans, alternative options and the necessary information to make an informed decision decision-making including consent for treatment. Finally, the Treater approach describes osteopaths who emphasise applying manual therapy to their patients' body to deliver treatment to help manage their health issues. Each approach is guided by a unique combination of values, attitudes, and beliefs that inform the clinical decision-making process and the delivery of care [29]. After analysing data and considering existing theories of

professional and educational practice [33–35], Thomson's theory proposes that an osteopaths' conception of practice is strongly related to the type of therapeutic approach that might characterise their clinical care [29]. In short, *conception of practice* refers to an osteopath's understanding of their practice, including their views on the nature of their skills, knowledge, and decision making and lies on a continuum ranging from *technical rationality* to *professional artistry* [32].

#### **Development of the Osteopaths Therapeutic Approaches Questionnaire (Osteo-TAQ)**

From Thomson et al.'s [29] original grounded theory, the Osteo-TAQ was developed to explore and measure a range of attitudes, behaviours and activities that characterise UK osteopaths' day-to-day clinical practice. Research has examined the face [36] and content validity [37] of the Osteo-TAQ. The reliability estimation is acceptable ( $\alpha=0.778$ ) for the questionnaire as a whole in the UK context [36]. With respect to content validity, review of the Osteo-TAQ by an international expert group was supported by high content validity index scores [37]. The underpinning theory of the Osteo-TAQ is based on the views of UK osteopaths and maintains that osteopathic clinical practice is complex and expertise is multidimensional. It is important to note that the original grounded theory [29, 32] and the subsequent intended meaning of the Osteo-TAQ was not assumed to be transferable to Australian osteopathic practice due to the differences in sociocultural and healthcare context. To ensure that the Osteo-TAQ survey items were of high quality and easy to understand for Australian osteopaths, cognitive interviews were conducted in accordance with best practice methods for questionnaire design [38] and this aspect of the study is reported in detail elsewhere [39]. Briefly, in response to the cognitive interviews, a series of minor amendments were made to the wording of the items within the Osteo-TAQ to enhance comprehension [39]. We also used the COSMIN guidelines (Consensus-based Standards for the selection of health Measurement Instruments) which were created to evaluate the methodological quality of studies on health measurement instruments' properties. This framework, designed by Mokkink et al. in 2010 [40], aims to enhance consistency and transparency in instrument selection. The guidelines cover aspects such as reliability, validity, responsiveness and interpretability, providing a comprehensive approach to assessing the properties of health measurement instruments.

This study is part of a broader program of research aimed at exploring and developing the Osteo-TAQ tool. The current study has two primary aims: firstly, to evaluate the structural, content and construct validity of the Osteo-TAQ tool in an Australian osteopathic practice

context, and secondly, to use the Osteo-TAQ to explore and describe the range of therapeutic approaches and conceptions of practice employed by Australian osteopaths in their care of patients. An additional aim of this study was to investigate the transferability of Thomson's [29] original grounded theory to the context of Australian osteopathic practice.

## Methods

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline was used to structure the methods of this observational study [41].

### Study design

This study employed a cross-sectional survey design.

### Participants and recruitment

This study invited osteopaths who were currently registered and practising in Australia to participate. Participants were recruited via two main strategies. The first strategy was through the Osteopathy Research and Innovation Network (ORION), a practice-based research network based at the University of Technology Sydney. ORION has 992 Australian osteopaths in its database [42]. An email was sent to all members of the ORION database, which included a participant information form and a link to the questionnaire on the Qualtrics platform. The second strategy involved using the research team's social media platforms to share a post with summary details of the study and survey link to online osteopathic groups and social media communities. The survey link was open for data collection between 22nd June 2023 and 4th August 2023. As a strategy to facilitate recruitment [43], potential participants could consent to being entered into a prize draw to win \$50AUD upon completion of the Osteo-TAQ.

### The instrument - the Osteo-TAQ

The Osteo-TAQ is a 36-item questionnaire exploring a range of behaviours and activities that osteopaths undertake in their day-to-day practice. It is based on previous qualitative grounded theory research with UK osteopaths [29, 31]. Responses to each item were on a four-point unipolar Likert-type frequency scale (never, sometimes, often, always). The questionnaire takes approximately 10 min to complete.

### Data analysis

Data from each completed questionnaire were extracted from Qualtrics and exported to Microsoft Excel for analysis. Data were cleaned and Osteo-TAQ data missing at random were imputed using the median score for the respective item. Participant responses were removed from the analysis if the participant did not consent

to participate or did not complete the questionnaire. Descriptive statistics were generated for the demographic variables. To evaluate the factor structure of the Osteo-TAQ, an exploratory factor analysis (EFA) was undertaken using the JASP statistical programme [44]. The EFA followed contemporary guidance for the conduct of such an analysis. Exploratory factor analysis (EFA) was chosen over a Principal Components Analysis [45] because we anticipate a confirmatory factor analysis and other item response theory approaches will be used to evaluate the dimensionality of the Osteo-TAQ in the future [46, 47]. Data were screened and determined to be non-normally distributed. Initially a polychoric correlation matrix was generated. Polychoric correlations are more appropriate than Pearson correlations for ordinal data as they are based on the concept that the ordinal categories are bivariate normal [48] and not measured on an interval scale [49, 50]. Theory-derived and empirical approaches (parallel analysis using the polychoric matrix [51]) were used to determine the number of factors to extract. The EFA used the ordinary least squares (OLS) extraction method as the data were not normally distributed and ordinal in nature [45]. The factors were expected to correlate; therefore, an oblique rotation (Oblimin) is appropriate to reduce the cross-loadings [45]. Items were retained if they loaded greater than 0.32 on a factor [52, 53] and demonstrated a cross-loading of less than 0.32 [53]. After an item was removed, the EFA was conducted again (iteration) [53]. The Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test of sphericity were also calculated to determine factorability of the data. Once the factor analysis was completed, descriptive statistics were generated for each retained item, and reliability estimations for each of the factors was calculated using McDonald's omega ( $w$ ).

## Results

Seven hundred and seventy-two osteopaths accessed the Osteo-TAQ through the survey weblink ( $n=772$ ) with seventeen ( $n=17$ ) not consenting to participate. Of the 755 who consented to participate, 23 ( $n=23$ ) did not provide any demographic data. Of the respondents who did provide demographic data, 41 ( $n=41$ ) did not provide a response to the Osteo-TAQ items. This resulted in 691 ( $n=691$ ) responses available for analysis. Three respondents did not respond to item 16 so the median value for this item was imputed.

### Participant demographics and practice information

Over half of the respondents identified as male ( $n=378$ , 54.7%) while 13 individuals (1.9%) identified as non-binary or a third gender (Table 1). Just under one-quarter of the respondents reported having graduated from Victoria University (Melbourne, Australia), making it

**Table 1** Demographic characteristics of respondents to the Osteopaths Therapeutic Approaches Questionnaire (Osteo-TAQ)

<b>Gender</b>	
Male	378 (54.7%)
Female	293 (42.4%)
Non-binary/third gender	13 (1.9%)
Prefer not to say	7 (1.0%)
<b>Age (years)</b>	
Mean ( $\pm$ SD)	36.0 ( $\pm$ 9.4)
<b>Years in clinical practice</b>	
Mean ( $\pm$ SD)	9.1 ( $\pm$ 8.3)
Range	1–48
<b>Primary Qualification (n, %)</b>	
RMIT University (or predecessors)	122 (17.6%)
Victoria University	156 (22.6%)
Southern Cross University	80 (11.6%)
University of Western Sydney	13 (1.9%)
Unitec	61 (8.8%)
International College of Osteopathy	100 (14.5%)
British School of Osteopathy (now University College of Osteopathy)	123 (17.8%)
European School of Osteopathy	23 (3.3%)
Other	13 (1.9%)

the most represented educational background among respondents. Participants in the current work were significantly more likely to be male ( $\chi^2=24.32$ ,  $p<0.001$ ) and approximate the average age of Australian osteopaths at the time of data collection [54].

### Descriptive statistics

The descriptive statistics for the 36 item Osteo-TAQ are presented in Table 2. All items had a median of 3 (except item 16 which had a median of 2) and a range from 1 to 4.) Item 16 (*I treat my patients only by talking with them*) had the lowest mean 2.44 (SD 1) (Table 2). Items 14 (*I seek verbal feedback from my patient to understand how the hands-on treatment feels for them at the time*) and item 36 (*I focus on developing rapport with my patient during hands-on treatment*) demonstrated the highest mean values, with means of 3.2 (SD 0.84) and 3.301 (SD 0.79) respectively.

### Exploratory factor analysis

The exploratory factor analysis (EFA) was conducted to identify the underlying structure of the data and to determine the number of latent factors. The analysis closely followed the approach taken in prior research by a member of this research team [55].

### Seven factor solution

Parallel analysis and an Eigenvalue greater than 1 suggested the extraction of seven factors. The KMO statistic was 0.904 and Bartlett's test was  $p<0.01$  ( $\chi^2=9174.76$ ) indicating an acceptable level of factorability. Items 8

(*I base my practise on osteopathic theories, principles and philosophy*) and 14 (*I seek verbal feedback from my patient to understand how the hands-on treatment feels for them at the time*) loaded below 0.32 onto a factor, and items 25 (*I use the same clinical examination procedures with every patient*) and 28 (*I am led by my patient as to the treatment and management approaches they want*) cross-loaded. The seven factors did not provide a logical solution empirically and did not align with the conceptual framework established by the grounded theory [29, 32], as several factors were not theoretically coherent or did not capture the relationships between constructs as intended by the original theory. For example, items 5 (*I prioritise talking with my patient to understand their problem over hands-on treatment*), 20 (*I discourage my patients from depending on me for frequent long-term treatment*) and 25 (*I use the same clinical examination procedures with every patient*) loaded onto factor 7 and did not align with the original grounded theory.

### Three factor solution

A 3-factor solution was forced based on the underpinning theory relating to the three therapeutic approaches [29]. The KMO statistic was 0.902 and Bartlett's test was  $p<0.01$  ( $\chi^2=7176.19$ ) indicating an acceptable level of factorability. Six iterations were performed. Items 4 (*I focus on finding the tissues causing symptoms during my examination of my patient*), 8 (*I base my practise on osteopathic theories, principles and philosophy*), 16 (*I treat my patients only by talking with them*), 29 (*I use palpation and joint assessment to direct treatment to address dysfunctions*) and 32 (*I decide the type of hands-on treatment that will be best for my patient*) all cross-loaded and were removed. Item 20 (*I discourage my patients from depending on me for frequent long-term treatment*) was removed due to a factor loading below 0.32. The final 3-factor structure contained 30 items explaining 36.5% of the variance (Table 3). Correlations between the factors were: factor 1 and 2 (0.440); factor 1 and 3 (0.161); and, factor 2 and 3 (0.331). Retained items loaded greater than 0.339 on a factor and had communalities ( $h^2$ ) of greater than 0.478. Unidimensional reliability for factor 1 was  $w=0.836$  (95%CI[0.818–0.854]), factor 2 was  $w=0.795$  (95%CI[0.772–0.818]), and factor 3 was  $w=0.783$  (95%CI[0.759–0.807]). Each item was reviewed based on the underpinning theory (Table 3). The Treater therapeutic approach captured all items on factor 3, however there was some cross-over between the Educator and Communicator therapeutic approaches across factors 1 and 2 (Table 3 and 6th column).

### Two factor solution

A two-factor solution was forced based on the underpinning theory, in particular the construct of conception of

**Table 2** Descriptive statistics for the Osteopaths' Therapeutic Approaches Questionnaire (Osteo-TAQ) items

Item	Mean	Std. Deviation
1. I collaborate with my patients (and their carer/guardian) to develop the most suitable treatment and management options for their presenting complaints.	3.107	0.848
2. I want my patients to self-manage their presenting complaints.	2.973	0.808
3. I provide my patients with a range of hands-on treatment and management options and let them choose.	2.973	0.838
4. I focus on finding the tissues causing symptoms during my examination of my patients.	3.081	0.811
5. I prioritise talking with my patients to understand their problem over hands-on treatment.	2.789	0.867
6. I provide the type of management and hands-on treatment my patients say they would prefer (if not contraindicated).	2.951	0.836
7. I tailor my clinical examination procedures to the individuality of my patients and their presenting complaints.	3.097	0.838
8. I base my practice on osteopathic theories, principles and philosophy.	3.100	0.792
9. I explain my clinical reasoning to my patients so they can make an informed decision about their care.	3.172	0.853
10. I ask my patients what hands-on treatment and management approaches they think would help them most of all.	2.957	0.824
11. I need to establish the specific anatomical structures associated with my patients' presenting complaints to provide effective treatment.	2.922	0.806
12. I use observation of my patients' postural alignment to direct my treatment.	2.925	0.858
13. I tell my patients to follow my instructions so that I can perform my hands-on treatment effectively.	2.957	0.869
14. I seek verbal feedback from my patients to understand how the hands-on treatment feels for them at the time.	3.200	0.773
15. I seek my patients' views about what hands-on treatment and management approaches they think might help them.	3.007	0.805
16. I treat my patients only by talking with them.	2.446	1.008
17. I am led by my patients as to their preferred approach to hands-on treatment and management of their presenting complaints.	2.784	0.794
18. I rely on my palpation skills as the primary diagnostic tool.	2.818	0.826
19. I involve my patients in deciding what hands-on treatment I provide.	2.944	0.797
20. I discourage my patients from depending on me for frequent long-term hands-on treatment.	2.896	0.831
21. I prioritise hands-on treatment of my patients over talking with them to understand their presenting complaints.	2.648	0.881
22. I decide the hands-on treatment approach my patients require due to their lack of understanding of osteopathy.	2.760	0.868
23. I provide my patients with an opportunity to decide the type of osteopathic care they would like to receive.	2.922	0.804
24. I combine information from different sources (i.e. clinical examination, my patients' expectations and the patient-practitioner relationship) to guide my clinical decisions.	3.127	0.887
25. I use the same clinical examination routine with every patient.	2.635	0.898
26. I rely on hands-on treatment to address my patients' presenting complaints.	2.955	0.759
27. I provide the care that I think is most suitable to help my patients' presenting complaints.	3.172	0.808
28. I am led by my patients as to the hands-on treatment and management approaches they want.	2.836	0.804
29. I use palpation and joint assessment to direct hands-on treatment to address dysfunctions.	3.041	0.812
30. I encourage my patients to contact me should they require additional support or advice.	3.169	0.821
31. I spend a significant portion of the consultation time talking with my patients to understand how their presenting complaint impacts their life.	3.017	0.787
32. I decide the type of hands-on treatment that will be best for my patients.	3.009	0.773
33. I educate my patients to support them to self-manage their presenting complaints.	3.114	0.789
34. I rely on palpation to provide information about the health of the body's tissues.	2.984	0.833
35. I offer treatment and management options to my patients for them to choose from.	3.085	0.797
36. I focus on developing rapport with my patients during hands-on treatment.	3.301	0.787

practice [32]. This solution initially demonstrated minimal cross-loadings and higher communalities than the three-factor solution. KMO was 0.907 and Bartlett's test was  $p < 0.01$  ( $\chi^2 = 7934.425$ ) indicating acceptable factorability. Four iterations produced an acceptable factor structure. Item 16 (*I treat my patients only by talking with them*) was removed due to cross-loading. Items 10 (*I ask my patients what treatment and management approaches they think would help them most of all*), 17 (*I am led by my patient as to their preferred approach to treatment and management of their presenting complaint*), and 28 (*I*

*am led by my patient as to the treatment and management approaches they want*) were removed due to factor loadings less than 0.32. The two-factor solution contained 32 items explaining 32.6% of the variance (Table 3). Retained items loaded greater than 0.337 on a factor with communalities ( $h^2$ ) greater than 0.523. The correlation between the two factors was 0.309. Unidimensional reliability for factor 1 was  $w = 0.881$  (95%CI[0.868–0.894]) and  $w = 0.796$  (95%CI[0.773–0.819]) for factor 2. Locating each item in either professional artistry or technical rational conceptions of practice, as proposed in

**Table 3** Three-factor structure for the Osteopaths' Therapeutic Approaches Questionnaire (Osteo-TAQ)

Item	Fac- tor 1	Fac- tor 2	Fac- tor 3	h <sup>2</sup>	Therapeutic approach
1. I collaborate with my patients (and their carer/guardian) to develop the most suitable treatment and management options for their presenting complaints.	0.714			0.478	Educator
36. I focus on developing rapport with my patients during hands-on treatment.	0.662			0.519	Communicator
24. I combine information from different sources (i.e. clinical examination, my patients' expectations and the patient-practitioner relationship) to guide my clinical decisions.	0.635			0.557	Communicator
27. I provide the care that I think is most suitable to help my patients' presenting complaints.	0.618			0.588	Educator
9. I explain my clinical reasoning to my patients so they can make an informed decision about their care.	0.617			0.535	Educator
7. I tailor my clinical examination procedures to the individuality of my patients and their presenting complaints.	0.597			0.566	Educator
30. I encourage my patients to contact me should they require additional support or advice.	0.561			0.583	Educator
14. I seek verbal feedback from my patients to understand how the hands-on treatment feels for them at the time.	0.560			0.591	Communicator
33. I educate my patients to support them to self-manage their presenting complaints.	0.489			0.674	Educator
2. I want my patients to self-manage their presenting complaints.	0.395			0.683	Educator
10. I ask my patients what hands-on treatment and management approaches they think would help them most of all.		0.600		0.626	Communicator
23. I provide my patients with an opportunity to decide the type of osteopathic care they would like to receive.		0.561		0.602	Educator
15. I seek my patients' views about what hands-on treatment and management approaches they think might help them.		0.531		0.626	Communicator
5. I prioritise talking with my patients to understand their problem over hands-on treatment.		0.517		0.703	Communicator
35. I offer treatment and management options to my patients for them to choose from.		0.514		0.682	Communicator
17. I am led by my patients as to their preferred approach to hands-on treatment and management of their presenting complaints.		0.485		0.676	Communicator
28. I am led by my patients as to the hands-on treatment and management approaches they want.		0.452		0.725	Communicator
19. I involve my patients in deciding what hands-on treatment I provide.		0.429		0.737	Communicator
3. I provide my patients with a range of hands-on treatment and management options and let them choose.		0.411		0.701	Communicator
6. I provide the type of management and hands-on treatment my patients say they would prefer (if not contraindicated).		0.397		0.664	Communicator
31. I spend a significant portion of the consultation time talking with my patients to understand how their presenting complaint impacts their life.		0.339		0.706	Communicator
21. I prioritise hands-on treatment of my patients over talking with them to understand their presenting complaints.			0.614	0.560	Treater
18. I rely on my palpation skills as the primary diagnostic tools.			0.594	0.652	Treater
26. I rely on hands-on treatment to address my patients' presenting complaints.			0.566	0.591	Treater
22. I decide the hands-on treatment approach my patients require due to their lack of understanding of osteopathy.			0.527	0.695	Treater
12. I use observation of my patients' postural alignment to direct my treatment.			0.516	0.686	Treater
13. I tell my patients to follow my instructions so that I can perform my hands-on treatment effectively.			0.511	0.589	Treater
25. I use the same clinical examination routine with every patient.			0.504	0.643	Treater
34. I rely on palpation to provide information about the health of the body's tissues.			0.503	0.693	Treater
11. I need to establish the specific anatomical structures associated with my patients' presenting complaints to provide effective treatment.			0.444	0.708	Treater

Thomson's theory, suggested a good degree of grouping (Table 4 and 5th column) and consistency with the underpinning theory [32].

## Discussion

The aim of this study was to evaluate the structural, content and construct validity of the Osteo-TAQ tool with respect to the practice of Australian osteopaths. The

current study builds on previous grounded theory work that identified therapeutic approaches and conceptions of practice in a UK osteopathic practitioner population [29, 32], and sought to further refine the previously developed Osteo-TAQ [36, 37]. In doing so, the current study has identified either a two- or three-factor structure for the Osteo-TAQ that is both empirically acceptable and consistent with the aforementioned grounded theory study

**Table 4** Two-factor structure for the Osteopaths Therapeutic Approaches Questionnaire (Osteo-TAQ)

Item	Fac-tor 1	Fac-tor 2	h <sup>2</sup>	Conception of practice
1. I collaborate with my patients (and their carer/guardian) to develop the most suitable treatment and management options for their presenting complaints.	0.726		0.523	Professional artistry
9. I explain my clinical reasoning to my patients so they can make an informed decision about their care.	0.690		0.535	Professional artistry
7. I tailor my clinical examination procedures to the individuality of my patients and their presenting complaints.	0.675		0.566	Professional artistry
30. I encourage my patients to contact me should they require additional support or advice.	0.654		0.574	Professional artistry
14. I seek verbal feedback from my patients to understand how the hands-on treatment feels for them at the time.	0.630		0.592	Professional artistry
36. I focus on developing rapport with my patients during hands-on treatment.	0.622		0.585	Professional artistry
24. I combine information from different sources (i.e. clinical examination, my patients' expectations and the patient-practitioner relationship) to guide my clinical decisions.	0.619		0.600	Professional artistry
33. I educate my patients to support them to self-manage their presenting complaints.	0.593		0.667	Professional artistry
2. I want my patients to self-manage their presenting complaints.	0.572		0.689	Professional artistry
27. I provide the care that I think is most suitable to help my patients' presenting complaints.	0.534		0.648	Professional artistry
23. I provide my patients with an opportunity to decide the type of osteopathic care they would like to receive.	0.494		0.732	Professional artistry
3. I provide my patients with a range of hands-on treatment and management options and let them choose.	0.484		0.746	Professional artistry
31. I spend a significant portion of the consultation time talking with my patients to understand how their presenting complaint impacts their life.	0.479		0.732	Professional artistry
6. I provide the type of management and hands-on treatment my patients say they would prefer (if not contraindicated).	0.476		0.713	Professional artistry
20. I discourage my patients from depending on me for frequent long-term hands-on treatment.	0.462		0.776	Professional artistry
15. I seek my patients' views about what hands-on treatment and management approaches they think might help them.	0.449		0.742	Professional artistry
19. I involve my patients in deciding what hands-on treatment I provide.	0.444		0.799	Professional artistry
5. I prioritise talking with my patients to understand their problem over hands-on treatment.	0.429		0.805	Professional artistry
4. I focus on finding the tissues causing symptoms during my examination of my patients.	0.425		0.661	Technical rational
35. I offer treatment and management options to my patients for them to choose from.	0.418		0.792	Technical rational
8. I base my practice on osteopathic theories, principles and philosophy.	0.337		0.741	Technical rational
21. I prioritise hands-on treatment of my patients over talking with them to understand their presenting complaints.		0.665	0.597	Technical rational
25. I use the same clinical examination routine with every patient.		0.586	0.689	Technical rational
22. I decide the hands-on treatment approach my patients require due to their lack of understanding of osteopathy.		0.579	0.688	Technical rational
18. I rely on my palpation skills as the primary diagnostic tools.		0.574	0.676	Technical rational
12. I use observation of my patients' postural alignment to direct my treatment.		0.554	0.674	Technical rational
13. I tell my patients to follow my instructions so that I can perform my hands-on treatment effectively.		0.550	0.562	Technical rational
26. I rely on hands-on treatment to address my patients' presenting complaints.		0.519	0.635	Technical rational
11. I need to establish the specific anatomical structures associated with my patients' presenting complaints to provide effective treatment.		0.456	0.699	Technical rational
34. I rely on palpation to provide information about the health of the body's tissues.		0.445	0.747	Technical rational
29. I use palpation and joint assessment to direct hands-on treatment to address dysfunctions.		0.389	0.686	Technical rational
32. I decide the type of hands-on treatment that will be best for my patients.		0.372	0.696	Technical rational

in the context of an Australian practitioner population. These findings provide some indication that the underpinning qualitative grounded theory has some transferability [56] to a different sample, (in this case Australian osteopaths) and may begin to build a case towards Thomson's et al. [29] original theory having theoretical generalisability [57] and potential to explain and understand osteopaths' therapeutic approaches and conceptions of

practice more widely using the Osteo-TAQ. However, further research in different cultural contexts is needed to establish the full extent of its theoretical reach.

A three-factor structure was explored based on the grounded theory study from which the Osteo-TAQ was derived and describes three therapeutic approaches to practise: Treater, Educator and Communicator [29]. In an Australian osteopathic practitioner population, the



factor structure of the Osteo-TAQ was largely consistent with these three therapeutic approaches. The Educator approach was reflected in the concepts of collaboration with the patient, developing rapport and self-management items, which grouped in the first factor. The Communicator approach also appeared consistent with the grounded theory whereby items related to seeking patient input into their care, providing patients with treatment and management options, and spending time talking with the patient about their complaint were identified in factor two. The distinction between these two factors could be debated, as they share an underlying conception of practice based on the concept of professional artistry - something observed in the two-versus three-factors structures. Both approaches were recognised and discussed in the original theory [29, 32], and it was expected that these two factors would correlate. The third factor comprised items consistent with the Treater approach in the original grounded theory work [29]. The items loading on this factor focused on the need for hands-on approaches to diagnosis and treatment directed by the practitioner. Although manual therapy is a dominant practice in osteopathy [2], there is increasing recognition of the need to include other therapeutic interventions (such as psychologically-informed care [58, 59]) as part of osteopathic management. The current work supports a three-factor structure for the Osteo-TAQ in an Australian population, with each factor demonstrating acceptable reliability estimations confirming that the items comprising each factor measure a single construct.

At a higher level of the grounded theory supporting the Osteo-TAQ, there are two ends of a continuum that represents osteopaths' conception of practice: the professional artistry and technical rational conceptions which underpin the three different therapeutic approaches developed from UK osteopaths [32]. Given the two anchors for this continuum, a two-factor structure for the Osteo-TAQ was explored in this current work. The items comprising factor one in the two-factor solution were largely those found in the Educator and Communicator factors in the three-factor solution, and are consistent with a conception of practice of professional artistry. With respect to the second factor in this solution, items 29 (*I use palpation and joint assessment to direct treatment to address dysfunctions*) and 32 (*I decide the type of hands-on treatment that will be best for my patient*) were retained in the factor. In the three-factor solution these items were removed. These two items, in addition to the other items comprising the second factor, are consistent with the technical rational conception of practice as described in the original grounded theory by Thomson et al. [32], whereby osteopaths with a technical rational conception adopt examination approaches that focus on the characteristics of the patient's body and tissues and how

these relate to the patients' pain, dysfunction and associated symptoms.

A second aim of this study was to describe the range of therapeutic approaches employed by Australian osteopaths in patient care, using the Osteo-TAQ. Seven hundred and seventy-two Australian osteopaths completed the survey, and this represented 25% of the registered osteopath population at the time of the study [60]. We are unable to comment on whether the data is representative of the approaches to practice of registered osteopaths in Australia. However, the data do point to several areas of practice that warrant discussion. Item 14 (*I seek verbal feedback from my patient to understand how the hands-on treatment feels for them at the time*) had the second highest mean value in the sample. This outcome suggests that feedback from the patient about their treatment is an important component of the therapeutic interaction for osteopaths in Australia, and is consistent mixed-methods research from osteopathy patients in Australia [61]. It is noteworthy that this item was removed in the seven-factor structure, supported by the parallel analysis, but retained in the other two factor structure. Conversely, item 16 (*I treat my patients only by talking with them*) demonstrated the lowest median and mean values. Although it is recognised that counselling and education form a part of the osteopathy consultation in conditions such as low back pain [62] and is expected by patients [63], this finding suggests that osteopaths rarely 'only talk' with their patients, and likely incorporate other active or manual therapy interventions in a consultation. It may be possible in future iterations of the Osteo-TAQ to classify individual practitioners based on their scores at factor level or identify where an individual practitioner sits on the continuum of conception of practice (from professional artistry to technical rational), based on the combination of scores on each factor. Further research is required to explore this hypothesis.

There are several limitations in the current work. The nature of the participant recruitment (social media recruitment, in particular) meant that a true response rate could not be determined. Due to the use of social media for recruitment and the anonymity of the survey, we acknowledge that we were unable to fully verify the identity or professional status of all respondents, which is an inherent limitation in health services and survey research relying on self-reported data [64]. Additionally, it is possible that potential participants received invitations to participate in the current work across multiple recruitment channels. Although participants were asked to not complete the survey multiple times, it is possible that some may have submitted multiple responses. Data screening was undertaken to identify any potential erroneous responses that required further investigation. The biases inherent in survey design work are also

a limitation. Social desirability bias may have led participants to respond in a manner that aligns more with a practitioner who utilises manual therapy in addition to education and active care, rather than showing a preference for a solely manual therapy approach. Acquiescence bias is also a potential limitation; however, the nature of the items and the response options meant that an individual answering all items on the one response option would not be reflective of the practice of any osteopath. Rather it may reflect a carelessness in responding to the items. Given these limitations, we do not comment on the generalisability of the findings to the broader population of Australian osteopaths and further work is required to establish this.

Although there are several limitations, the strength of the study is the blending of theoretical and empirical approaches to explore the therapeutic approaches and conceptions of practice of osteopaths in Australia. The relatively large sample size also provides some support to the factor structures identified in the current work. Further research using confirmatory factor analysis and item response theory approaches is required to provide additional evidence for the structural validity of the questionnaire. There is also an opportunity to explore the structural and content validity of the Osteo-TAQ in other jurisdictions where the practice of osteopathy may vary for example, in the United States where osteopathic physicians are licensed to practise the full scope of medicine or in countries where the process of achieving professional regulation is ongoing [1]. This latter work could also identify if the conceptions of practice and therapeutic approaches employed by osteopaths are consistent across the countries where osteopathy is practised. Identifying individuals who score high or low on a particular factor and interviewing them about their therapeutic approach and conceptions of practice, will provide additional evidence to support the factors identified in the current work. There is also an opportunity to evaluate the relationship between the Osteo-TAQ and other commonly used measures of practice such as the PABS-PT [15] to better understand the nature of osteopathic practice.

## Conclusion

This study provides evidence for the structural, content and construct validity of the Osteo-TAQ in an Australian osteopathic practitioner population. Additionally, the results of the work provide support for the transferability of the grounded theory underpinning the Osteo-TAQ to the Australian osteopathic practitioner population. From both theoretical and empirical perspectives, it can be inferred that the Osteo-TAQ tool effectively encapsulates the three main therapeutic approaches to patient care: Educator, Communicator and Treater. These approaches

align to an osteopaths' conception of practice which encompasses both professional artistry and technical rationality. Further research is required to explore each of these therapeutic approaches to better understand how they relate to an individual osteopaths' conception of practice, and if, they inform patient care, and their associations with other measures of practice including clinical outcomes.

## Abbreviations

ABS-mp	Attitudes to Back Pain Scale in Musculoskeletal Practitioners
CARE	Consultation and Relational Empathy
COSMIN	Consensus-based Standards for the selection of health Measurement Instruments
EFA	Exploratory Factor Analysis
ORION	Osteopathy Research and Innovation Network
Osteo-TAQ	Osteopaths' Therapeutic Approaches Questionnaire
PABS-PT	Pain Attitudes and Beliefs Scale for Physical Therapists
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology

## Acknowledgements

We wish to thank fellow members Strengthening Osteopathic Leadership and Research (SOLAR) – An International Leadership Capacity Building Project for Research in Osteopathy. We would also like to thank all participants for providing the data.

## Authors' contributions

OT, BV, MF and GM contributed to the design and conception of the study. OT and BV carried out the data collection, all authors contributed to data analysis. All authors contributed to the drafting of the manuscript, and all have read and approved the final manuscript.

## Funding

This study received funding from Osteopathy Australia (OA). The funding source had no influence in the design of the study, or collection, analysis, and interpretation of data or in writing the manuscript. The research reported in this paper is the sole responsibility of the authors and reflects the independent ideas and scholarship of the authors alone.

## Data availability

No datasets were generated or analysed during the current study.

## Declarations

### Ethics approval and consent to participate

This study was approved by the Human Research Ethics Committee of the University of Melbourne (Application number 23587). The University of Melbourne Human Research Ethics Committee is registered with the Australian Government National Health and Medical Research Council (EC00146, <https://www.nhmrc.gov.au/research-policy/ethics/human-research-ethics-committees>). The research was performed in accordance with the Declaration of Helsinki. Prior to taking part in the cognitive interviews all participants provided their informed consent after reading an information sheet and returning the signed informed consent form to the lead researcher. Completion of the Osteo-TAQ was considered informed consent.

### Consent for publication

Not applicable.

### Competing interests

OT is an Associate Editor for BMC Health Service Research but was not involved with any peer-review or editorial decisions regarding this manuscript. All other authors have no competing interests.

### Author details

<sup>1</sup>Health Sciences University, UCO School of Osteopathy, London, UK

<sup>2</sup>Australian Research Centre in Complementary and Integrative Medicine, Faculty of Health, University of Technology Sydney, Sydney, Australia

<sup>3</sup>Department of Medical Education, University of Melbourne, Melbourne, Australia

<sup>4</sup>Faculty of Health, Southern Cross University, Lismore, Australia

<sup>5</sup>Royal Melbourne Institute of Technology, Melbourne, VIC, Australia

Received: 18 December 2023 / Accepted: 23 October 2024

Published online: 01 November 2024

## References

1. The OIA global report. Global review of osteopathic medicine and osteopathy 2020 – osteopathic international alliance. <https://oialliance.org/the-oia-global-report-global-review-of-osteopathic-medicine-and-osteopathy-2020/>. Accessed 17 Nov 2021.
2. Ellwood J, Carnes D. An international profile of the practice of osteopaths: a systematic review of surveys. *Int J Osteopath Med*. 2021;40:14–21.
3. Cotton A. Osteopathic principles in the modern world. *Int J Osteopath Med*. 2013;16:17–24.
4. Kasiri-Martino H, Bright P. Osteopathic educators' attitudes towards osteopathic principles and their application in clinical practice: a qualitative inquiry. *Man Ther*. 2016;21:233–40.
5. O'Keefe M, Cullinane P, Hurley J, Leahy I, Bunzli S, O'Sullivan PB, O'Sullivan K. What influences patient-therapist interactions in Musculoskeletal Physical Therapy? Qualitative systematic review and Meta-synthesis. *Phys Ther*. 2016;96:609–22.
6. Osteopathy Board of Australia. <https://www.osteopathyboard.gov.au/>. Accessed 16 Aug 2023.
7. Adams J, Sibbritt D, Steel A, Peng W. A workforce survey of Australian osteopathy: analysis of a nationally-representative sample of osteopaths from the Osteopathy Research and Innovation Network (ORION) project. *BMC Health Serv Res*. 2018;18:352.
8. Wagner A, Ménard M, Jacquot E, et al. The profile of French osteopaths: a cross-sectional survey. *Int J Osteopath Med*. 2023;49:100672. <https://doi.org/10.1016/j.ijosm.2023.100672>.
9. Santiago RJ, Nunes A, Esteves JE, Cerritelli F, Verbeeck J, Lopes S, Paquete M, van Dun P. The Portuguese osteopathic practitioners estimates and RATES (OPERA): a cross-sectional survey. *Int J Osteopath Med*. 2022;43:23–30.
10. Plunkett A, Fawkes C, Carnes D. Osteopathic practice in the United Kingdom: a retrospective analysis of practice data. *PLoS ONE*. 2022;17:e0270806.
11. Burke SR, Myers R, Zhang AL. A profile of osteopathic practice in Australia 2010–2011: a cross sectional survey. *BMC Musculoskelet Disord*. 2013;14:227.
12. Fleischmann M, Vaughan B, Grace S, Stewart A, Hart C, Brew E, Masters G, Smeeton L, Thompson L, Brooks M. The use of visceral techniques in Australian osteopathic practice: a descriptive cross-sectional study. *Adv Integr Med*. 2021;8:292–7.
13. Alvarez G, Roura S, Cerritelli F, Esteves JE, Verbeeck J, van Dun PLS. The Spanish osteopathic practitioners estimates and RATES (OPERA) study: a cross-sectional survey. *PLoS ONE*. 2020;15:e0234713.
14. van Dun PLS, Verbeeck J, Arcuri L, Esteves JE, Cerritelli F. (2022) The Profile of Belgian Osteopaths: A Cross-Sectional Survey. *Healthcare (Basel)*. <https://doi.org/10.3390/healthcare10112136>.
15. Ostelo RWJG, Stomp-van den Berg SGM, Vlaeyen JWS, Wolters PMJC, de Vet HCW. Health care provider's attitudes and beliefs towards chronic low back pain: the development of a questionnaire. *Man Ther*. 2003;8:214–22.
16. Pincus T, Vogel S, Santos R, Breen A, Foster N, Underwood M. The attitudes to back pain scale in musculoskeletal practitioners (ABS-mp): the development and testing of a new questionnaire. *Clin J Pain*. 2006;22:378–86.
17. Waddell G, Newton M, Henderson I, Somerville D, Main CJ. A fear-avoidance beliefs questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*. 1993;52:157–68.
18. Darlow B, Perry M, Mathieson F, Stanley J, Melloh M, Marsh R, Baxter GD, Dowell A. The development and exploratory analysis of the Back Pain attitudes Questionnaire (Back-PAQ). *BMJ Open*. 2014;4:e005251.
19. Smith K, Thomson OP. What do UK osteopaths view as the safest lifting posture, and how are these views influenced by their back pain beliefs? *Int J Osteopath Med*. 2020;37:10–6.
20. Bar-Zaccay A, Bailey D. The attitudes and beliefs of UK osteopaths towards the management of low back pain: a cross-sectional study. *Int J Osteopath Med*. 2018;28:42–7.
21. Macdonald RJD, Vaucher P, Esteves JE. The beliefs and attitudes of UK registered osteopaths towards chronic pain and the management of chronic pain sufferers – a cross-sectional questionnaire based survey. *Int J Osteopath Med*. 2018;30:3–11.
22. Van Biesen T, Alvarez G. Beliefs about chronic low back pain amongst osteopaths registered in Spain: a cross-sectional survey. *Int J Osteopath Med*. 2020;36:3–10.
23. Moran RW, Rushworth WM, Mason J. Investigation of four self-report instruments (FABT, TSK-HC, Back-PAQ, HC-PAIRS) to measure healthcare practitioners' attitudes and beliefs toward low back pain: reliability, convergent validity and survey of New Zealand osteopaths and manipulative physiotherapists. *Musculoskelet Sci Pract*. 2017;32:44–50.
24. Fitzgerald K, Vaughan B, Fleischmann M, Austin P. Pain knowledge, attitudes and beliefs of Australian osteopaths drawn from a nationally representative sample of the profession. *J Bodyw Mov Ther*. 2020;24:43–50.
25. Draper-Rodi J, Vogel S, Bishop A. Effects of an e-learning programme on osteopaths' back pain attitudes: a mixed methods feasibility study. *Pilot Feasibility Stud*. 2021;7:174.
26. Licciardone JC, Aryal S. Patient-centered care or osteopathic manipulative treatment as mediators of clinical outcomes in patients with chronic low back pain. *J Osteopath Med*. 2021;121:795–804.
27. Mercer SW, Maxwell M, Heaney D, Watt GC. The consultation and relational empathy (CARE) measure: development and preliminary validation and reliability of an empathy-based consultation process measure. *Fam Pract*. 2004;21:699–705.
28. Kerry R, Low M, O'Sullivan P. Person-centred clinical reasoning and evidence-based healthcare. *Eur J Pers Cent Healthc*. 2020;8:215.
29. Thomson OP, Petty NJ, Moore AP. Clinical decision-making and therapeutic approaches in osteopathy – a qualitative grounded theory study. *Man Ther*. 2014;19:44–51.
30. Thomson O. Clinical decision making and therapeutic approaches of experienced osteopaths. University of Brighton; 2013.
31. Thomson OP, Petty NJ, Moore AP. Osteopaths' professional views, identities and conceptions – A qualitative grounded theory study. *Int J Osteopath Med*. 2014;17:146–59.
32. Thomson OP, Petty NJ, Moore AP. A qualitative grounded theory study of the conceptions of clinical practice in osteopathy – a continuum from technical rationality to professional artistry. *Man Ther*. 2014;19:37–43.
33. Fish D. Appreciating practice in the Caring professions: refocusing Professional Development and Practitioner Research. Butterworth-Heinemann Medical; 1998.
34. Fish D, Coles C, editors. Developing professional judgement in health care: learning through the critical appreciation of practice. Oxford; Boston: Butterworth-Heinemann; 1998.
35. Schon DA. Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions. San Francisco: Jossey-Bass; 1987. <https://doi.org/10.1002/chp.4750090207>.
36. Thomson OP, Anstiss V. The development and exploratory analysis of the osteopaths' therapeutic approaches questionnaire (Osteo-TAQ). *Int J Osteopath Med*. 2020;37:17–24.
37. Thomson OP, Vaughan B, Sampath K, Draper-Rodi J, Fleischmann M, Cerritelli F. The osteopaths' therapeutic approaches questionnaire (Osteo-TAQ) – A content validity study. *Int J Osteopath Med*. 2022. <https://doi.org/10.1016/j.ijosm.2022.07.001>.
38. Ryan K, Gannon-Slater N, Culbertson MJ. Improving Survey methods with cognitive interviews in small- and medium-scale evaluations. *Am J Evaluation*. 2012;33:414–30.
39. Thomson OP, McLeod GA, Fleischmann M, Vaughan B. Development and adaptation of the osteopaths' therapeutic approaches questionnaire (Osteo-TAQ) for the Australian osteopathic profession – A cognitive interview study. *Int J Osteopath Med*. 2024;53:100723.
40. Mokkink LB, Terwee CB, Knol DL, Stratford PW, Alonso J, Patrick DL, Bouter LM, de Vet HC. The COSMIN checklist for evaluating the methodological quality of studies on measurement properties: a clarification of its content. *BMC Med Res Methodol*. 2010;10:22.
41. von Elm E, Altman DG, Egger M, Gøtzsche PC, Vandenbroucke JP, STROBE Initiative. The strengthening of reporting of Observational studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. *Int J Surg*. 2014;12:1495–9.
42. Steel A, Peng W, Sibbritt D, Adams J. Introducing national osteopathy practice-based research networks in Australia and New Zealand: an overview to inform future osteopathic research. *Sci Rep*. 2020;10:846.

43. Edwards P, Roberts I, Clarke M, DiGiuseppi C, Prata S, Wentz R, Kwan I. Increasing response rates to postal questionnaires: systematic review. *BMJ*. 2002;324:1183.
44. (2023) JASP 0.18.2, 2023. In: JASP - Free and User-Friendly Statistical Software. <https://jasp-stats.org/2023/12/29/introducing-jasp-0-18-2-beta-process-survival-analysis-and-more/>. Accessed 2 Sep 2024.
45. Gaskin CJ, Happell B. On exploratory factor analysis: a review of recent evidence, an assessment of current practice, and recommendations for future use. *Int J Nurs Stud*. 2014;51:511–21.
46. Schmitt TA. Current methodological considerations in exploratory and confirmatory factor analysis. *J Psychoeduc Assess*. 2011;29:304–21.
47. Baglin J. (2019) Improving Your Exploratory Factor Analysis for Ordinal Data: A Demonstration Using FACTOR. *Practical Assessment, Research, and Evaluation* 19:5.
48. Courtney MGR. (2019) Determining the Number of Factors to Retain in EFA: Using the SPSS R-Menu v2.0 to Make More Judicious Estimations. *Practical Assessment, Research, and Evaluation* 18:8.
49. Holgado-Tello FP, Chacón-Moscoso S, Barbero-García I, Vila-Abad E. Polychoric versus Pearson correlations in exploratory and confirmatory factor analysis of ordinal variables. *Qual Quant*. 2010;44:153–66.
50. Basto M, Pereira JM. An SPSS R-Menu for Ordinal factor analysis. *J Stat Softw*. 2012;46:1–29.
51. Garrido LE, Abad FJ, Ponsoda V. A new look at Horn's parallel analysis with ordinal variables. *Psychol Methods*. 2013;18:454–74.
52. Hair JF. *Multivariate Data Analysis*. Prentice Hall; 2010.
53. Tabachnick BG, Fidell LS. (2001) *Using Multivariate Statistics*. Allyn and Bacon.
54. Osteopathy Board of Australia. <https://www.osteopathyboard.gov.au/About/Statistics.aspx>. Accessed 2 Sep 2024.
55. Vaughan B. Developing a clinical teaching quality questionnaire for use in a university osteopathic pre-registration teaching program. *BMC Med Educ*. 2015;15:70.
56. Lincoln YS, Guba EG. *Naturalistic Inquiry*. SAGE; 1985.
57. Carminati L. Generalizability in qualitative research: a tale of two traditions. *Qual Health Res*. 2018;28:2094–101.
58. Shaw R, Abbey H, Casals-Gutiérrez S, Maretic S. Reconceptualizing the therapeutic alliance in osteopathic practice: integrating insights from phenomenology, psychology and enactive inference. *Int J Osteopath Med*. 2022;46:36–44.
59. Abbey H, Nanke L, Brownhill K. Developing a psychologically-informed pain management course for use in osteopathic practice: the OsteoMAP cohort study. *Int J Osteopath Med*. 2021;39:32–40.
60. (2023) Osteopathy Board of Australia. <https://www.osteopathyboard.gov.au/>. Accessed 5 Dec 2023.
61. Orrock PJ. The patient experience of osteopathic healthcare. *Man Ther*. 2016;22:131–7.
62. Abrosimoff M, Rajendran D. Tell me your story - how osteopaths apply the BPS model when managing low back pain - A qualitative study. *Int J Osteopath Med*. 2020;35:13–21.
63. Cross V, Leach CMJ, Fawkes CA, Moore AP. Patients' expectations of osteopathic care: a qualitative study. *Health Expect*. 2015;18:1114–26.
64. Topolovec-Vranic J, Natarajan K. The use of social media in recruitment for medical research studies: a scoping review. *J Med Internet Res*. 2016;18(11):e286.

### Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.